

Science Foundation Ireland



Agenda 2020

Annual Review
2017

2020

**#Believe
InScience**



Contents

1	Executive summary	3
2	Highlights of Science Foundation Ireland's achievements to-date under Agenda 2020	6
2.1	Internationally recognised SFI Research Centres	7
2.2	Ireland has moved from 20th to 11th in global scientific rankings	9
2.3	The % of publications in the top 1% as measured by citations	10
2.4	SFI Research Professorship Programme	11
2.5	Excellence & Impact – Highly cited Science Foundation Ireland researchers	12
2.6	Supporting early career researchers	13
2.7	Gender balance	14
2.8	Leading globally on impact and research integrity	14
2.9	SFI Strategic Partnership Programme	14
2.10	SFI Industry Fellowship Programme	15
2.11	Significant growth in the number of partnerships with international funders	15
2.12	Measuring the economic impact of publicly-funded R&D	16
2.13	Strong progress made in mainstreaming education and public engagement activities	17
3	Key Performance Indicator (KPI) status	20
	Glossary	28



1

Executive summary

Agenda 2020 is Science Foundation Ireland's current strategic plan; it was launched in 2012 and will run until 2020. Agenda 2020 is an ambitious plan to position Ireland as a global knowledge leader, a society with scientific and engineering research at its core, driving economic, social and cultural development.

The plan is to build on the considerable achievements in Ireland's scientific and enterprise communities since Science Foundation Ireland was established, and to realise the tremendous potential for further development and growth by 2020.

Agenda 2020 contains objectives, actions, indicators and targets. Science Foundation Ireland's progress on all of these is regularly evaluated. In June 2017, the Science Foundation Ireland Board updated Agenda 2020, primarily to ensure the Foundation's strategy is fully aligned with the national science and innovation strategy, Innovation 2020, which was launched in 2015. This update exercise also enabled the progress of each Key Performance Indicator (KPI) within Agenda 2020 to be assessed, and likely outcomes to be forecast.

Twice a year, Science Foundation Ireland undertakes an internal review of Agenda 2020 performance. This document delivers the review for 2017. These reviews indicate that Science Foundation Ireland is making excellent progress towards meeting the targets set out in Agenda 2020. This progress is demonstrated by the numerous success stories presented in this document, and by the vast majority of KPI targets which are on course to be met or surpassed.

2020

This publication is structured in two parts: an overview of Science Foundation Ireland's successes, followed by a detailed analysis of the KPIs and targets.

Highlights of some particularly notable achievements:

Science Foundation Ireland has funded 17 world-leading Research Centres.

The first 12 SFI Research Centres have signed collaborative research agreements with over 300 industry partners representing cumulative company commitments of over €120 million and have won €132 million from a range of international funding agencies, e.g. competitive European Union schemes. These SFI Research Centres collaborate with hundreds of companies all over Ireland, supporting the creation and retention of high-value regional jobs.

The SFI Research Professorship Programme attracts outstanding research talent to Ireland.

The Programme recruits world-leading researchers to be professorial chairs in Ireland. These Research Professors catalyse new research activities and attract other excellent researchers, outstanding students and company collaborations. Eight star Research Professors have been attracted to-date.

The quality of the research funded by Science Foundation Ireland can be measured by how influential the resulting publications are.

International publication databases measure the influence of scientific publications. Science Foundation Ireland-funded publications were more than twice as likely to be extremely influential than the global average.

Ensuring that research is carried out to the highest standards of honesty, accuracy, objectivity and verifiability is known as research integrity.

Research integrity is critical in ensuring that scientific research is reproducible. Scientific reproducibility is a fundamental requirement of the scientific method. A three-year pilot programme on research integrity training across the research performing organisations commenced in September 2017. This training is provided by Epigeum, and is part-funded by Science Foundation Ireland.

Gender imbalance in research teams is a global issue.

Science Foundation Ireland is working towards tackling the significant gender imbalance in the Science Foundation Ireland-funded research community. Science Foundation Ireland has published its Gender Strategy which sets out the agency's roadmap to improving the representation and progression of women in all aspects of science, technology, engineering, and maths (STEM) careers in Ireland. In Agenda 2020, Science Foundation Ireland set a target of making 25% of its awards to female researchers by 2020; this target was achieved in 2017. In this document, this target is revised to 30%.

Science Foundation Ireland partners with research funders in other countries to support excellent researchers based in Ireland; collaborating with excellent researchers around the globe.

These partnerships enable mutually beneficial transfers of knowledge and expertise to and from Ireland. Science Foundation Ireland has established partnerships with the most prestigious funders in the United Kingdom, and has also significantly extended the reach of international partnerships by launching a new partnership with the National Natural Science Foundation of China (NSFC) in March 2017.

The US National Science Foundation (NSF) Innovation Corps Programme (I-Corps) is an extremely prestigious programme which prepares researchers to extend their focus beyond the laboratory and achieve economic and societal impact from their research projects.

Science Foundation Ireland is the first European funding agency to implement the I-Corps programme. At the launch of this partnership, Professor Mark Ferguson, Director General of Science Foundation Ireland and Chief Scientific Adviser to the Government of Ireland, said: “This extremely prestigious programme builds on Ireland’s international reputation for research excellence, and on the long-standing relationship that exists between Science Foundation Ireland and the NSF. It will greatly enhance Ireland’s innovation potential, with SFI-funded researchers receiving immersive, real-world training in bringing scientific and technological research to market.”

Impactful research from the laboratory is typically developed by entrepreneurs and innovators.

The intellectual property in the research can be protected by applying for a patent on the technology. These patents refer to the relevant scientific publications in order to fully explain the provenance of and context around the new technology. 50% of Ireland’s patent-cited publications were funded in part or in whole by Science Foundation Ireland. This demonstrates that the research being funded by the Foundation is vital to the commercialisation process.

Science Foundation Ireland’s Agenda 2020 states:

“Science and technology play an increasingly important role in addressing the economic, social and environmental problems faced by the world today. That role needs the support and active engagement of the public who fund the work and are the ultimate beneficiaries of it.”

Science Foundation Ireland’s Education and Public Engagement Programme seeks to promote the awareness and engagement of the Irish public with STEM. As part of this, Science Foundation Ireland has partnered with the national broadcaster, RTÉ, to develop television programming related to STEM that has broad audience appeal. For example, series two of “Big Week on the Farm” reached an average of 312,000 viewers and almost 26% share of audiences. Almost 1.5 million viewers nationwide tuned in.

2

Highlights of Science Foundation Ireland's achievements to-date under Agenda 2020

Science Foundation Ireland reviews its progress against Agenda 2020 twice per year. These reviews include examples of successes and case studies of notable achievements. The mid-year review checks progress against KPI targets; the annual review is published on Science Foundation Ireland's website. Both reports are submitted to the Science Foundation Ireland Board. These reviews have indicated that Science Foundation Ireland is successfully delivering against Agenda 2020 and will achieve the majority of its targets.

The following sections highlight Science Foundation Ireland's key achievements from the annual reviews.



Prof Mark Ferguson, Director General and Chief Scientific Adviser to the Government of Ireland, with An Taoiseach Leo Varadkar TD, at the launch of four new SFI Research Centres

2.1 Internationally recognised SFI Research Centres

The world-leading SFI Research Centres are major funding awards which link scientists and engineers in partnerships across academia and industry to address crucial research questions; foster the development of new and existing Irish-based technology companies; attract industry that could make important contributions to Ireland and its economy; and expand educational and career opportunities in Ireland in science and engineering. They have both reformed and transformed the research landscape in Ireland.

Seventeen SFI Research Centres have been established and in 2017, three further SFI Research Centre proposals were approved in principle by the Science Foundation Ireland Board, but unfortunately the Foundation had insufficient budget to fund these.



- Before the SFI Research Centres were established, industry was investing relatively limited amounts in research in Ireland's higher education institutions. The existing 12 SFI Research Centres have transformed this, having signed collaborative research agreements with over 300 industry partners representing cumulative company commitments of over €120 million.
- The SFI Research Centres act as magnets to attract and retain foreign direct investment in Ireland, and for companies to develop R&D activities here.
- SFI Research Centres support indigenous companies, both large and small, and create new spin-out companies; in all cases Industry-relevant researchers are being trained in academia for large and small, foreign and indigenous companies.
- SFI Research Centres have a strong commercial focus; they have already exceeded their targets for intellectual property and spin-out creation. Companies they have created are scaling and employing people in high-value jobs.
- SFI Research Centres collaborate with hundreds of companies all over Ireland – this supports the creation and retention of high-value regional jobs.
- Research excellence and global thought-leadership are at the core of SFI Research Centres. They are outstanding examples of ABC (Applied and Basic Combined) research. Global challenges in areas such as health and energy are being tackled.
- SFI Research Centres excel at winning international funding. By the end of 2016, the first 12 Research Centres had won €132 million from a range of international funding agencies, e.g. competitive EU Horizon 2020 programmes. This funding is used to generate jobs, intellectual and commercial outcomes.

The SFI Research Centres act as magnets to attract and retain foreign direct investment in Ireland, and for companies to develop R&D activities here.

Four new SFI Research Centres launched in 2017



CONFIRM, the SFI Research Centre for smart manufacturing, will be revolutionary for Irish manufacturing competitiveness. It will deliver the technological advances and expertise for a smart manufacturing innovation ecosystem, enabling companies to compete within the rapidly changing global landscape, and boosting Ireland’s reputation as a leading international manufacturing location. These new technologies will be at the heart of the factories of the future, increasing product line adaptability, enabling real-time decision making, shortening supply-chains, and speeding up the development of new innovations to produce higher-quality goods at reduced costs across all industry sectors. CONFIRM is a cross-institutional Research Centre led by the University of Limerick (UL).



FutureNeuro, the SFI Research Centre for neurological science, will focus on addressing the socio-economic burden caused by chronic and rare neurological diseases. In an internationally unique manner, FutureNeuro links innovative neurotherapeutics development with genomic and biomarker-based patient stratification, a national eHealth infrastructure and a nationwide clinical network. It will strengthen Ireland’s ability to attract foreign direct investment from companies active in the multi-trillion euro global market for diagnostics, treatments and medical technologies for neurological diseases, and facilitate indigenous companies seeking to access this market. FutureNeuro is a cross-institutional Research Centre led by the Royal College of Surgeons (RCSI).



BEACON, the SFI Research Centre for bioeconomy, will develop alternative technologies based on renewable biological resources. The future economy must use biological resources sustainably to produce valuable goods, such as bioactive molecules, chemical building blocks, plastics, fuels, and energy. In Ireland, the agri-food and marine sectors produce high volumes of residues during food production. The conversion of these residues to higher value products will create new business opportunities. The bioeconomy will be a key driver to stimulate rural and agricultural redevelopment. BEACON is a cross-institutional Research Centre led by University College Dublin (UCD).



I-FORM, the SFI Research Centre for advanced manufacturing, will enhance processing efficiency for Irish manufacturing, allowing the production of highly customised 3-D printed components exhibiting superior performance. This will be achieved through the efficient use of advanced process monitoring, incorporating embedded sensors and process control in the entire value chain from ‘powder to final product’. The Centre will enhance the manufacturability of bespoke components and products using 3D printing techniques and will make a distinct and positive impact on the international competitiveness of Irish additive manufacturing. I-Form is a cross-institutional Research Centre led by University College Dublin (UCD).



Pictured at the launch of four new SFI Research Centres (L-R): Prof Denis Dowling (UCD), Director of I-FORM, Prof Kevin O’Connor (UCD), Director of BEACON, Prof Mark Ferguson, Director General of Science Foundation Ireland and Chief Scientific Advisor to the Government of Ireland, Minister for Training, Skills, Innovation, Research and Development, John Halligan, T.D., Ms Ann Riordan, Chair of Science Foundation Ireland Board, Prof Conor McCarthy (UL), Director of CONFIRM, Prof David Henshall (RCSI), Director of FutureNeuro.

SFI Researcher of the Year 2017



Prof Mike Zaworotko, Science Foundation Ireland Research Professor, University of Limerick

Prof Zaworotko’s research activities are focused on fundamental and applied aspects of crystal engineering, with a particular emphasis on aspects of chemistry including metal-organic materials (MOMs) and multi-component pharmaceutical materials (MPMs), that have many potential applied uses in the areas of pharmaceuticals, clean tech and energy. In 2011 Thomson-Reuters listed him as the 20th highest impact chemist since 2000 and in 2014 he was listed in the top 3,000 cited researchers across all disciplines. Prof Zaworotko is now Co-Director of the SFI Research Centre for Synthesis and Solid State Pharmaceuticals (SSPC) leading their Phase 2 application and vision for the Centre to become the leading centre of excellence shaping the future of global pharmaceuticals. He is the first SFI Research Professor to take up a role as a SFI Research Centre Director.

Prof Zaworotko on receiving the award:

“The investments that have been made in science and technology funding in recent years mean that there is a rising tide of globally impactful science and engineering research in Ireland. There are many deserving researchers for this prestigious award, which means that I am delighted and honoured to receive the award. I look forward to making further contributions to the ‘rising tide’ of Irish science.”

2.2 Ireland is now 11th in global scientific rankings

Ireland is now 11th in global scientific ranking for the overall quality of scientific research (Thompson Reuters/Clarivate InCites). Ireland broke into the top ten for a period in 2016-2017.

Science Foundation Ireland calculates Ireland’s place in bibliometric rankings on a six-monthly basis; our placing will vary slightly from month to month. As of November 2017, Ireland was ranked 11th, based on InCites¹ data. Subject areas of excellence in which we are performing well include:

	Nanotechnology	2nd
	Animal and Dairy Science	2nd
	Immunology	2nd
	Agricultural Sciences	4th
	Mathematics	4th
	Materials Science	5th
	Chemistry	6th

In the period from 2012-2016, over 12,500 publications directly associated with Science Foundation Ireland awards were reported. Each of these publications represents a new discovery or scientific advancement. In the period 2012-2016, while Ireland ascended the world scientific rankings, just under 3,000 highly-trained personnel departed from Science Foundation Ireland-supported research projects. The largest cohort moved to industry; these expert researchers are critical inputs to Ireland’s economy.



1 <https://clarivate.com/products/incites/>

2.3 The % of publications in the top 1% as measured by citations

Science Foundation Ireland has analysed the Thomson Reuters/Clarivate data regarding various countries' and funders' % of publications in the top 1% of all publications, as measured by citations. The analysis covers the time range 2003 to 2017. 2.54% of Science Foundation Ireland-funded publications are in the top 1% of global scientific publications, as measured by citations. This 2.54% result is better than the figure for all Irish scientific research publications (including those funded by Science Foundation Ireland) which is 1.59%. This illustrates the value of Science Foundation Ireland's competitive international peer review research selection processes and is comparable to figures from other prestigious international research funding agencies e.g. the National Science Foundation (NSF) in USA is 2.82% and the US National Institutes of Health (NIH) is 2.88%.

It is also comparable with other countries, for example: Israel 1.56%; UK 1.78%; USA 1.76%; and Denmark 2.41%.

From a historical perspective, if we take Ireland from 1980-2002 (any funder), the result is 1.02% publications in the top 1%. As a result of Science Foundation Ireland's funding, an additional 1.52% of papers appear in the top 1%. Therefore, the overall system has improved – with a disproportionate impact from high quality Science Foundation Ireland-funded publications.

Country	Funder	# Documents in Web of Science	Documents in the top 1%
Ireland	All	154,578	1.59%
Ireland	Science Foundation Ireland	14,661	2.54%
USA	All	8,489,771	1.76%
USA	NSF	457,581	2.82%
USA	NIH	698,000	2.88%
Denmark	All	267,823	2.41%
Singapore	All	201,478	2.08%
UK	All	2,341,194	1.78%
Finland	All	214,411	1.71%
New Zealand	All	152,308	1.69%
Israel	All	254,092	1.56%
China	All	3,298,910	0.93%
EU	European Research Council	49,575	4.71%

This illustrates the value of Science Foundation Ireland's competitive international peer review research selection processes and is comparable to figures from other prestigious international research funding agencies.

2.4 SFI Research Professorship Programme



Pictured back row L-R: Prof Stefan Andersson-Engels, Prof William Wijns, Director General of Science Foundation Ireland, Prof Mark Ferguson, Prof Aljoscha Smolic; Front row L-R: Prof Bogdan Staszewski, Prof Mike Zaworotko and Prof Piet Lens

The SFI Research Professorship Programme attracts outstanding research talent to Ireland.

The Programme supports national strategic priorities by assisting research bodies in the recruitment of world-leading researchers for professorial chairs, or similar research leadership positions. The programme may also act as a mechanism to support the recruitment of individuals who possess a strong industry background. 2016 was the most successful year to-date for the SFI Research Professorship Programme, with six awards being made. Awards were made in areas where strategic gaps have been identified; specifically, two of the awards are in the domain of advanced manufacturing; or where key technologies for Ireland can be strengthened e.g. digital technologies. **Stars matter.** The SFI Research Professors are already attracting companies, outstanding students and staff to Ireland, as well as winning significant non-Irish exchequer competitive research funding e.g. EU Horizon 2020.

The SFI Research Professors are:

- **Prof Piet Lens**, National University Ireland Galway, Energy Technologies
- **Prof William Wijns**, National University Ireland Galway, Medical Devices; Clinical Trials
- **Prof Paul Weaver**, University of Limerick, Processing Technologies; Manufacturing
- **Prof Aljoscha Smolic**, Trinity College Dublin, Digital Platforms and Content
- **Prof Stefan Andersson-Engels**, Tyndall National Institute, Biophotonics; Medical Devices
- **Prof Mike Zaworotko**, University of Limerick, Chemistry - pharma/energy
- **Prof Fengzhou Fang**, University College Dublin, Manufacturing
- **Prof Bogdan Staszewski**, University College Dublin, Electrical Engineering / Internet of Things

CASE STUDY

Royal Society Fellowship



Prof Kenneth Wolfe, University College Dublin

Prof Kenneth Wolfe, a genetic scientist based at University College Dublin, has been elected a Fellow of the Royal Society in recognition of his scientific research. His election recognises a major contribution towards how scientists think about evolution. His group discovered the genomes of many species which became completely duplicated during their evolution, doubling the number of genes they contain.

There are only five other Fellows of the Royal Society in Ireland. Prof Wolfe is the first scientist to be elected from University College Dublin since Edward Conway in 1947. There are now more Fellows of the Royal Society in Ireland than at any time since Irish independence. Royal Society Fellows include many of the world's most distinguished scientists.

Science Foundation Ireland awards investment of €43 million through SFI Investigators Programme



Pictured (L-R): Prof Adrian Bracken, Prof Mark Ferguson, Minister John Halligan TD, Prof Jane Farrar, Prof Peter Humphries, Prof Louise Bradley, Prof John Boland, Prof Andrew Bowie, Prof Kingston Mills, Prof Martin Caffrey at the announcement of the SFI Investigators Programme, which will support 26 research projects and 94 research positions over the next five years, in key areas including mathematical modelling, nanoscience, inflammatory diseases, cancer, materials and climate change.

2.5 Excellence & Impact – Highly-Cited Science Foundation Ireland Researchers

The Clarivate Analytics Most Highly-Cited Researchers list represents some of the world's most influential scientific minds. These researchers, spanning 21 fields of the sciences and social sciences, rank in the top 1% by citations for field and publication year in Web of Science.

Science Foundation Ireland-supported researchers that feature in the list include:

- **Dr Paul Allen**, Teagasc
- **Prof Elke Arendt**, University College Cork
- **Prof Jonathan Coleman**, Trinity College Dublin
- **Prof John Cryan**, University College Cork
- **Prof Henry Curran**, National University of Ireland Galway
- **Prof Colm O'Donnell**, University College Dublin
- **Prof Luke O'Neill**, Trinity College Dublin
- **Prof Paul Ross**, University College Cork
- **Prof Catherine Stanton**, Teagasc
- **Prof Da-Wen Sun**, University College Dublin

2.6 Supporting early career researchers

Science Foundation Ireland's early career programmes include the SFI Starting Investigator Research Grant (SIRG), the SFI Career Development Award (CDA), and the SFI Future Research Leaders (FRL) programmes.

Highlights from 2017 involving early career researchers include:

- **Prof Caitriona Lally (CDA holder)** is amongst four early career awardees from Science Foundation Ireland who have all secured European Research Council Starting Grants.
- **Prof Gianpiero Cavalleri** published a study that illustrates extensive genetic substructure within the Travellers and dates the divergence of the Travellers from Settled Irish to around 10 generations ago.
- **PIYRA recipient Prof Carel W. le Roux** was part of a study used to change the international guidelines for the use of surgery in diabetic patients.
- **SIRG awardee Dr Damien Thompson** has continued to publish in high-impact journals including Nature Materials, Nature Nanotechnology and Nature Communications.



Pictured above: Dr Liz Elvidge, Head of Postdoc Development Centre, Imperial College London, was the keynote speaker at the Science Foundation Ireland research careers event which brought 350 Masters/PhD students and early career researchers together in September 2017.



CASE STUDY

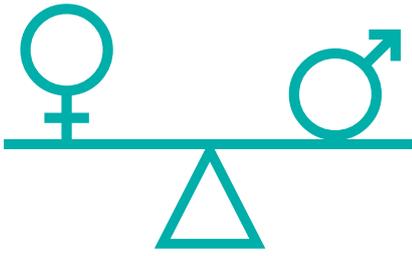
SFI Early Career Researcher of the Year 2017



Dr Rachel McLoughlin, Trinity College Dublin

In the past 10 years, Dr McLoughlin has established a unique international reputation as one of the key opinion leaders on Staphylococcus aureus host pathogen interactions.

Dr McLoughlin's findings have paved the way for new approaches to next generation anti-S. aureus vaccine development. As a result, she has developed a strong collaboration with GSK vaccine, the largest global vaccine company. GlaxoSmithKline currently sponsor a Trinity College Dublin PhD student. The significant impact, made by Dr McLoughlin's research is most clearly measured by her success in obtaining research funding. Since 2010 she has raised €6.2 million from national (Science Foundation Ireland, Health Research Board, Irish Research Council) and international (Wellcome Trust, EU-Marie Curie) sources. In 2015, she was awarded funding via the SFI Investigator Programme. Dr McLoughlin is passionate about scientific outreach and in 2012, she was awarded an RDS science live bursary to develop an interactive lecture/demonstration called 'ImmuneWars: bugs and beyond' to introduce primary school children to the immune system and how it protects from infection. She has established this as an annual outreach programme at Trinity College Dublin. So far around 300 children have participated in this event.



2.7 Gender balance

The Athena SWAN Charter was established in 2005 in the UK to encourage and recognise commitment to advancing the careers of women in science, technology, engineering, maths and medicine employment in higher education and research. The Athena SWAN Charter launched in Ireland in early 2015 and is a major national initiative supported by Science Foundation Ireland and the Higher Education Authority (HEA). Figures published by the HEA highlight gender inequality as an issue for the higher education sector. Across Irish universities, only 19% of professors are women. Across the Institutes of Technology, women make up 45% of academic staff, but just 29% of senior academic staff.

Science Foundation Ireland aimed to increase the number of female award-holders to 25% by 2020 (KPI A1.3.8), from an average of 19% in the period 2008–2012. This target was achieved in 2016. Science Foundation Ireland is now working towards 30% female award-holders within its portfolio by 2020.

Working towards this target, Science Foundation Ireland introduced a number of actions: trialling caps on applications in the Starting Investigator Research Grant (SIRG), incentivising female applications; a supplemental discretionary allowance to enable Science Foundation Ireland-funded research teams to provide cover for a team member who goes on maternity or adoptive leave; the SFI Advance Award Programme which aims “to provide female postdoctoral researchers with an opportunity to remain in, or return to, high-quality research.” The SIRG trial was particularly successful: in 2015, 44% of applications to the programme were women, a significant improvement over the previous 25%.

2.8 Leading globally on impact and research integrity

Science Foundation Ireland has been a key player, nationally and internationally, in increasing the impact of the research it funds and addressing research integrity.

Science Foundation Ireland is finalising the first trial of an internationally comparative structure for quality assurance review/non-financial audit. In addition, a three-year pilot programme on research integrity training across the research performing organisations commenced in September 2017. This ‘advanced on-line’ training is provided by Epigeum, and is part-funded by Science Foundation Ireland. The Foundation is acknowledged as a leader in research impact assessment and some of its primary developments, for example Science Foundation Ireland’s impact panel has been copied by other regions e.g. EU, New Zealand.

In addition to these actions, Science Foundation Ireland has reviewed its internal processes in terms of diversity and has a target to achieve 40% representation of expert reviewers of each gender by 2020. To deepen the Foundation’s commitment to diversity among the research community, unconscious bias training is being rolled out to all Science Foundation Ireland staff. Science Foundation Ireland has published its Gender Strategy 2016-2020 on its website.

2.9 SFI Strategic Partnership Programme

Science Foundation Ireland’s Strategic Partnerships Programme funds compelling collaborative research opportunities that are not otherwise served by other national funding programmes. Significant co-funding from non-Irish exchequer sources e.g. company, a collection of companies, funding agency, charity, philanthropic organisation or international higher education institution is required. The SFI Research Centres Spokes Programme permits new partners to work with the existing SFI Research Centres, again with a co-funding requirement.

At the end of 2017, Science Foundation Ireland had awarded 18 Strategic Partnerships with industry (including nine Pfizer awards) and 16 SFI Research Centres Spokes awards.

Three SFI Research Centres, supported by Science Foundation Ireland and the Irish Universities Association, collaborated to achieve €6.1 million in Horizon 2020 funding for a postdoctoral training programme.

2.10 SFI Industry Fellowship Programme

Since the launch of the SFI Industry Fellowship Programme in 2013, 145 SFI Industry Fellowships have been awarded. A number of resources have been put in place to help companies find potential academic partners. Science Foundation Ireland has created a private SFI Industry Fellowship Programme group on LinkedIn, where potential industry and academic partners have registered their details. Currently there are 800 active members on the LinkedIn page. The Programme has resulted in more qualified researchers moving to employment in companies in Ireland. Science Europe's recent survey of the movement of postdoctoral researchers from academia to industry shows Science Foundation Ireland as a leader in Europe, in terms of programmes supporting employment of postdoctoral researchers by industry.

2.11 Significant growth in the number of partnerships with international funders

Science Foundation Ireland is the first European funding agency to implement the **US National Science Foundation (NSF) Innovation Corps Programme** for entrepreneurial training. This world renowned training programme is developing the entrepreneurial and market skills of Irish researchers. Teams that comprised researchers and entrepreneurial mentors travelled to the U.S. to undertake training as part of the NSF I-Corps™ curriculum.

Science Foundation Ireland is also partnering with the NSF under the **Partnerships for International Research and Education (PIRE) Programme**. The primary goal of PIRE is to support high quality projects in which advances in research and education could not occur without international collaboration.

Under the **US-Ireland R&D Partnership Programme**, Science Foundation Ireland announced three new Centre-to-Centre awards, with an investment of €2.5 million, in November 2016. The three new collaborations include three of the 12 Research Centres (MaREI, AMBER and CURÁM) and are focused on making innovative discoveries and advances relating to renewable energy, new memory cells for electronic devices and biodegradable orthopaedic devices.

The **UK Engineering and Physical Sciences Research Council (EPSRC)-Science Foundation Ireland Partnership** was launched in April 2017. The new partnership will support joint UK/Irish research and technology development in all areas of EPSRC's remit which covers chemistry, engineering, information and communications technologies, materials, mathematical sciences and physics. In these partnerships, Science Foundation Ireland funds the teams and research work in Ireland and the partner funds the collaborating teams in their country.

In other UK partnerships, since the start of 2016, there have been 12 awards made under the **Science Foundation Ireland-Health Research Board-Wellcome Partnership** amounting to a total of €11 million, with Science Foundation Ireland contribution €3.27 million. There have been six awards made under the **Royal Society-Science Foundation Ireland partnership** amounting to a total of €2.8 million, and there have been 14 awards made under the **BBSRC-Science Foundation Ireland partnership** amounting to €6.7 million.

A new Fraunhofer Project Centre at Dublin City University (DCU) was funded through the **SFI Strategic Partnerships Programme** in March 2017. This initiative is jointly funded by Science Foundation Ireland and the Fraunhofer Gesellschaft in Germany. This Centre will focus on microfluidic 'lab-on-a-chip' technologies in support of the MedTech industry. This is the first Fraunhofer Centre in Ireland.

Science Foundation Ireland launched a new partnership with the **National Natural Science Foundation of China (NSFC)** in March 2017. The call focused on thematic areas of co-operation which are priorities in both countries including: novel functional materials and devices, data analytics, management, security and privacy, digital platforms, content and applications, smart grids and smart cities, future networks and communications, energy and environmental sustainability, manufacturing competitiveness and future agri-food. Science Foundation Ireland expects to co-fund eight awards with an investment of €8.6 million, and €4 million from the NSFC.

These partnerships associate Science Foundation Ireland with highly prestigious research funders, clearly demonstrating the quality of Irish research on an international level. They also allow a small country like Ireland to draw on the infrastructure, expertise and resources of larger countries, thereby growing both Irish academia and industry access to infrastructure and expertise which could be difficult for a small country to provide on its own.

CASE STUDY

SFI Best International Engagement Award



I-LOFAR led by Prof Peter Gallagher, Trinity College Dublin

The International Low Frequency Array Telescope (ILT) is a €150 million network of radio telescopes, that stretches across nearly 2,000 km across Europe, making it the largest low frequency radio telescope in the world. In 2017, the Irish Low Frequency Array (I-LOFAR) Consortium built a LOFAR radio telescope in Birr Castle and joined the ILT. To join this major international project, eight institutions from Ireland and Northern Ireland (Trinity College Dublin, Armagh Planetarium, University College Dublin, University College Cork, National University Ireland Galway, Dublin City University, Dublin Institute for Advanced Studies and Athlone Institute of Technology) formed the I-LOFAR Consortium. Together, they raised nearly €3 million from Science Foundation Ireland, the Department of Business, Enterprise and Innovation, and philanthropic and corporate sponsors, which has allowed them to build a LOFAR telescope, join the ILT, and develop a visitor centre.

In addition to opening new frontiers in astrophysics, I-LOFAR is an 'ICT telescope', producing vast quantities of data. As a result, it is opening new opportunities for collaboration with the SFI Research Centre network such as ADAPT and CONNECT, and with leading multinational companies.

2.12 Measuring the economic impact of publicly funded R&D

Scientific papers are frequently referenced as part of the patent application process to demonstrate the uniqueness of proposed invention compared to 'prior art'. Li et al. (2017) and others agree that analysing linkages between the scientific and patent literatures provides insights into how private sector R&D is benefiting from publicly-funded research as a foundation for building additional intellectual property.

Science Foundation Ireland has used patent citations of Irish academic publications as a proxy for measuring the potential economic impact of publicly-funded R&D in Irish-based industries; a first step in determining the longer term economic impact of Science Foundation Ireland investment.

Key findings of this study include:

- **300** companies are building intellectual property on Science Foundation Ireland-funded research, **40%** of these create jobs in Ireland, **10%** of these are IDA client companies. Regional impact is evident.
- **50%** of Ireland's patent-cited publications were funded in part or in whole by Science Foundation Ireland.
- **31.1%** of SFI Investigator Programme (IvP) awards between 2005 and 2013 produced a paper that was cited in a patent.





2.13 Strong progress made in mainstreaming Education & Public Engagement activities

Science Foundation Ireland has been working with the national broadcaster, RTÉ, and other partners through its SFI Discover Programme, to catalyse a transformation in scientific coverage and programming, particularly that which highlights Irish stories relating to science, technology, engineering and maths (STEM) across all media platforms. Through the Science Foundation Ireland-RTÉ partnership, three one-off documentaries, five television series and three children’s television series with scientific content have been aired. There has been an increased focus on science in broadcast media, with several independently-funded pieces airing, including documentaries, ‘filmed for web’ features and increased news coverage from RTÉ’s dedicated science correspondent.

Under the joint agreement with RTÉ, Science Foundation Ireland supported a portfolio of programming in 2017, that featured at peak schedule times to broad audiences. This included:

- Series 2 of ‘Big Week on the Farm’ which screened live and daily across one week, reaching an average of 312,000 viewers and almost 26% share of audiences. By the end of the week almost 1.5 million viewers nationwide had tuned in.
- The documentary ‘Will A Robot Steal My Job?’ screened on Monday 13th of Science Week 2017, reaching an audience of over 250,000 viewers.

Science Week content was featured across the RTÉ schedule, including promos for the week, daily coverage within the weather forecasts on RTÉ One, news items and online content across RTÉ social media channels. This resulted in strong science-related content and conversations featuring across the RTÉ schedule throughout Science Week.



Since 2012, Science Week has gathered more than 1.5 million participants in almost 5,200 events. In 2017, Science Week took place from November 12th-19th with over 1,200 events across the country, involving 315,000 participants. These events included 12 festivals taking place in: Cavan/Monaghan, Sligo, Mayo, Galway, Limerick, Kerry, Cork, Waterford, Carlow, Tipperary and the Midlands. The Teagasc Festival of Food and Farming took place across O'Dublin, Meath, Carlow, Galway, Cork and Wexford. A number of events were coordinated by Science Foundation Ireland including 'Scintillating Science with Dara O'Briain' which sold out at the National Concert Hall and a Science Week Family Open Day in the Convention Centre Dublin, which also sold out.

The mission of the SFI Discover Programme is to catalyse, inspire and guide the best in STEM education and public engagement, and between 2012-2017 over 300 SFI Discover awards have been made to a value of €16.5 million. In 2017, SFI Discover supported activities included:

- The SFI Science Zone at the Big Day Out which took place on Sunday, 18 March 2017 in Dublin and included a number of workshops, shows and science fair-style exhibits. The Science Zone was visited by a wide audience made up predominantly of families.
- Tech Week took place in April 2017 and reached a wide audience, particularly in schools. Two national finals took place – the Bebras Computational Challenge and the Scratch competition.
- The Bealtaine Living Earth Festival is coordinated by CALMAST at Waterford IT and took place from 20 to 28 May 2017. Bealtaine is Ireland's biggest biodiversity and natural heritage festival and involves a range of partners from the southeast of Ireland.
- Space Week 2017 took place from 4th to 10th to October and was co-ordinated by CIT Blackrock Castle Observatory. The Space Week theme was "Our Planet, Our Space, Our Time" and nearly 200 events took place nationally in a diverse range of venues including schools, libraries, theatres, colleges, observatories and science centres.



SFI Outstanding Contribution to STEM Communications Award 2017

Dr Aoibhinn Ní Shúilleabháin,
University College
Dublin



Dr Aoibhinn Ní Shúilleabháin, an Assistant Professor in the School of Mathematics and Statistics in University College Dublin, has shown years of dedication to communicating science and mathematics.

A regular contributor to national broadcast channels, Aoibhinn has also set up initiatives to promote physics and mathematics including the City of Physics, and Maths Sparks in University College Dublin.

The following is a list of some of her many contributions to STEM public engagement and communication:

- Director and founder of City of Physics, a city-wide public engagement project with the aim of promoting conversations and dialogue about physics around Dublin.
- Director and founder of Maths Sparks – a series of mathematics workshops, funded by Science Foundation Ireland and University College Dublin, for post-primary students from schools designated as disadvantaged.
- Regular STEM contributor on national radio shows such as Anton Savage (Today FM), Futureproof (Newstalk), Ray D’Arcy Show (RTE 1), John Murray Show (RTE 1).
- National ambassador for Science Week in 2011, 2013 and 2015.
- Contributor to Maths Week since its inception in 2012 and organiser of local events for the public.
- Discover Science and Engineering Ambassador promoting STEM in primary schools and presenting school awards in 2005, 2006, and 2014.
- Ambassador for Dublin City of Science during EuroScience Open Form (ESOF) 2012.
- Director and organiser of #science140 social media project which challenged scientists and science communicators to communicate science in 140 characters.
- With colleagues in science communication and science education, collated and edited these tweets which were published in a book ‘A Neutron walks into a bar...’ and where all proceeds were donated to Cystic Fibrosis Ireland charity.

CASE STUDY

SFI Best Reported Impact



Prof Fiona Newell, Trinity College Dublin

Dr Fiona Newell's research taps into the growing demand for novel, non-pharmaceutical solutions to age-related decline in motor and cognitive function, through therapeutic approaches using video games. Dr Newell has collaborated with computer scientists, gerontologists, gaming companies and large international companies based in Ireland, to develop better assessment tools and interventions that are specifically designed for older adults. The results of these assessments support a perceptual biomarker of risk of cognitive and physical decline.

Funded by Science Foundation Ireland, Dr Newell has developed a game called CityQuest, for a range of platforms including Oculus Rift, that targets improvement in perceptual and cognitive functions in a fun and engaging manner for the user.

3

Key performance indicator (KPI) status

A recent update of Agenda 2020 approved by the Science Foundation Ireland Board resulted in the addition of several new KPIs. The following table provides a progress update on the original Agenda 2020 KPIs and sets baselines for the new KPIs.

Existing Agenda 2020 KPI targets remain unchanged, while new KPI or sub-KPI and associated targets, are highlighted in yellow.

KPI#	Description	Current Target	Current Status	Discussion/new target detail/ revised forecast
A1.3.1	Proportion of SFI expenditure in the areas identified in the 2012 Report of the Research Prioritisation Steering Group, and/or in areas of demonstrable potential economic impact for Ireland, and/or in areas of significant partnership with major research entities, and/or to support the development of young researchers	100% by 2015	98.8% in 2017 (€126m). 1.2% in other areas (€1.5m) [SFI Finance data Q4 2017]	100% by 2020
A1.3.2	Ireland's bibliometric rankings in international rankings of repute (citations/paper)	Inside Top 20 for period to 2020	11th [2017]	Inside Top 20 for period to 2020
A1.3.3	Presence of a top-tier international prize-winning scientist (e.g. Nobel Prize, Fields Medal, European Science Prize, Lasker Prize) leading a Science Foundation Ireland-funded team in Ireland	1 (by 2015)	None as of Q4 2017. Strong progress on Brexit discussions with high level scientists in UK.	1 (by 2020)
A1.3.4	The winning of a prestigious international prize (e.g. Nobel Prize, Fields Medal, European Science Prize, Lasker Prize) by a Science Foundation Ireland-funded researcher/team	1 (by 2020)	None as of Nov 2017	1 (by 2020)
A1.3.5(a)	The level of early career research support	50% increase by 2015; i.e. €7.4m per annum from 2015-2020	€8.29m projected 2017 spend. 7% of spend. [SFI Finance data Q4 2017]	40 awards per annum between SIRG and CDA
A1.3.5(b)	The level of early career research support	4	1 (Research Careers Forum – Q3 2017)	Hold one career workshop for early career researchers per annum by 2020
A1.3.5(c)	The level of early career research support	100	0	Fund 100 PhD student positions in new PhD studentship programme by 2020
A1.3.6	The number of European Research Council awards secured by Science Foundation Ireland-funded researchers.	Science Foundation Ireland-funded researchers to secure €20 million per annum from the European Research Council	8 x European Research Council awards awarded to date (€3.8m), comprising: 4 x Proof of Concept (€0.6m), 1 x Advanced Grant (€1.9m), 1 x Starter Grant (€1.3m), 2 x Consolidator Grants.	STEM researchers in Ireland to secure €12m funding per annum from the European Research Council by 2020

KPI#	Description	Current Target	Current Status	Discussion/new target detail/ revised forecast
A1.3.7(a)	The attraction to Ireland of leading iconic scientists	Average 1 per year to 2020	SFI Research Professor: One approved award is currently being finalised. Future Research Leaders (FRL): Q4 2017- Four awards made, one currently being finalised.	Average 10 awards per annum by 2020 in each of SFI Research Professorship and SFI Future Research Leader schemes
A1.3.7(b)	The attraction to Ireland of leading iconic scientists	2	2	Add two iconic scientists in Advanced Manufacturing by 2020
A1.3.7(c)	The attraction to Ireland of leading iconic scientists	2	0	Relocate two UK iconic scientists using European Research Council development and support schemes
A1.3.7(d)	The attraction to Ireland of leading iconic scientists	1	0	Add at least one female Research Professor by 2020
A1.3.8	Increased representation of women in Science, Engineering and Technology (SET) in Ireland.	25% of Science Foundation Ireland award holders by 2020	25% female award holders [RO 2016]. 35% of all team members are female [RO 2016].	30% of Science Foundation Ireland award holders by 2020
A1.3.9	Challenge-based funding	1	0	Launch challenge-based funding scheme by 2020
A2.3.1	Proportion of invention disclosures, patents, licences and spin-outs recorded by Enterprise Ireland that are linked to Science Foundation Ireland-funded research	Patents filed and awarded: 222; spin-outs 18 by 2020	100 invention disclosures, 66 patents filed / awarded, 43 licenses, three spin-outs [RO 2016]	100 patents and 10 spin-outs per annum by 2020
A2.3.2	Ireland's level of public-private co-publications (form European Innovation Scoreboard)	50 co-publications per million population	No updated data available from EIS; 34 is the latest (2015 data). 51 [Science Foundation Ireland calculation based on RO 2016]	50 co-publications per million population
A2.3.3	Support entrepreneurship	48	12	12 awardees per annum in SFI-NSF Innovation Corps Programme by 2020

KPI#	Description	Current Target	Current Status	Discussion/new target detail/ revised forecast
A3.3.1(a)	Presence of internationally recognised research centres of scale in Ireland	15 by 2016	16 SFI Research Centres have been funded to-date. Science Foundation Ireland-funded four new SFI Research Centre awards in 2017	20 by 2020
A3.3.1(b)	Presence of internationally recognised research centres of scale in Ireland	1	2	Fund a successful SFI Research Centre in Advanced Manufacturing
A3.3.2	Major non-exchequer investment into such centres - for example, from corporate R&D entities and international funders such as the EU	Minimum of 50% of overall centres' funding by 2020	Non-exchequer investment currently stands at 41% of the overall Centre budget	Minimum of 50% of overall centres' funding by 2020
A4.3.1(a)	Increased hiring of Science Foundation Ireland-trained researchers by Industry	50% of team leavers moving to industry as first destination	23% [RO 2016] Eventual destination 40% via LinkedIn tracking [Science Foundation Ireland calculation based on RO 2016 & LinkedIn data]	50% Science Foundation Ireland team members in Industry six or more years after their award
A4.3.1(b)	Increased hiring of Science Foundation Ireland-trained researchers by Industry	200	145 (Cumulative)	Increase Industry Fellowship awards to 50 per annum
B1.3.1(a)	Joint funding instruments with key agencies (Irish and International) and companies	A measurable increase in the joint funding instruments by 2020	With agencies: €7.4m or 6% of spend [SFI finance data 2017]. With companies: €3.4m or 3% of spend [SFI finance data 2017]	4% of spend on agency funding partnerships, 2% of spend on industry funding partnerships
B1.3.1(b)	Joint funding instruments with key agencies (Irish and International) and companies	12	Eight in Horizon 2020 (5 ERA-Nets, 3 JPIs)	Participate in three JPIs or ERA-Nets per annum by 2020
B1.3.1(c)	Joint funding instruments with key agencies (Irish and International) and companies	3	Four partnerships with UK SFI-RS SFI-BBSRC SFI-ESPRC SFI-HRB/WT	Maintain at least three partnerships with UK funders ongoing by 2020

KPI#	Description	Current Target	Current Status	Discussion/new target detail/ revised forecast
B1.3.1(d)	Joint funding instruments with key agencies (Irish and International) and companies	4	0 (funded awards under previous collaboration ongoing)	One partnership with Northern Ireland funder ongoing by 2020
B1.3.1(e)	Joint funding instruments with key agencies (Irish and International) and companies	12	In 2017, three US-IRL R&D Partnership awards have been made with a 4th award LoO to be issued in Q4 2017	At least three US-Ireland R&D Partnership awards per annum by 2020
B1.3.1(f)	Joint funding instruments with key agencies (Irish and International) and companies	12	4	Three SFI-NSF-GROW visits per annum by 2020
B1.3.2	Relationships developed with Ireland's international strategic partners, as identified by Government policy	Demonstrable increase in collaborations with these partners in 2020	154 Academic Collaborations (134 with the US and UK, 20 with ISCA countries) [RO 2016] 81 non-academic collaborations (73 with the US and the UK, 8 with ISCA countries) [RO 2016]	200 academic collaborations per annum in total between Ireland and US, UK, and ISCA countries
B1.3.3	Level of leadership roles in European initiatives (for e.g. the number coordinator roles in Horizon 2020, leadership roles in the JPIs, Ireland as a co-location centre in a KIC, etc.)	260 leaderships in total 2013-2020	23 EU leadership roles [RO 2016]	On average 35 leaderships per annum by 2020
B1.3.4	Enterprise liaison positions in Science Foundation Ireland	2	0	Resource two additional enterprise liaison positions in Science Foundation Ireland by 2020
B2.3.1	Research income secured from international funding entities e.g. EU	€120m per annum by 2020	€71m [RO 2016]	€100m per annum by 2020
B2.3.2	Major testbeds established in Ireland	Average of one major new test bed per year	No SFI Research Infrastructure call ran in 2017. Large investment made by Science Foundation Ireland in 2016.	Invest on average €15m per annum on Research Infrastructure by 2020

KPI#	Description	Current Target	Current Status	Discussion/new target detail/ revised forecast
B2.3.3	Funding profile of Science Foundation Ireland researchers	Reduce to 30% the number of Science Foundation Ireland researchers that rely on Science Foundation Ireland for the majority of their funding by 2020	40.5% dependent [RO 2016]	Reduce to 30% the number of Science Foundation Ireland-funded researchers that rely on Science Foundation Ireland for the majority of their funding by 2020
B2.3.4	Partnership funding with industry	Co-fund at least two partnerships per year by 2020	Science Foundation Ireland awarded: 18 Strategic Partnerships with industry (including 9 Pfizer awards), 16 SFI Research Centres Spokes and 145 Industry Fellowships	Co-fund at least five partnerships per year by 2020
C1.3.1(a)	Level of coverage of Science Foundation Ireland/science by the media in news coverage, documentary coverage, kids programmes e.g. Elev-8	By 2020, the presence of at least one science programme/ series in the peak schedule of the national broadcaster, annually	<p>Traditional media:</p> <p>1,010 newspaper articles 902 online web articles 32 radio and television broadcasts.</p> <p>New media:</p> <p>Number of website visitors (users): 99,580 Total page views: 536,320 Average number of returning visitors: 48.55% Total number of followers across all social media channels: 103,864</p>	By 2020, the presence of at least two science programmes/series in the peak schedule of the national broadcaster, annually
C1.3.1(b)	Level of coverage of Science Foundation Ireland/science by the media in news coverage, documentary coverage, kids programmes e.g. Elev-8	1,200 newspaper articles referencing Science Foundation Ireland	825 newspaper articles referencing Science Foundation Ireland [2016]	1,200 newspaper articles referencing Science Foundation Ireland

KPI#	Description	Current Target	Current Status	Discussion/new target detail/ revised forecast
C1.3.1(c)	Level of coverage of Science Foundation Ireland/science by the media in news coverage, documentary coverage, kids programmes e.g. Elev-8	Establish measurable presence in new media/online space	Total web-page views: 543,000	Total web-page views 600,000
C1.3.1(d)	Level of coverage of Science Foundation Ireland/science by the media in news coverage, documentary coverage, kids programmes e.g. Elev-8	60%	49%	Increase public awareness of STEM from 49% to 60% of the population (350,000 additional people)
C1.3.2(a)	Level of take-up of STEM subjects at secondary level in school	Arrest decline observed over 2007-2011 and subsequently drive a measurable increase	Secondary level: 264,613 [2017]	Arrest decline observed over 2007-2011 and subsequently drive an increase to 300k by 2020
C1.3.2(b)	Level of application to and take up in STEM courses at third level	Arrest decline observed over 2007-2011 and subsequently drive a measurable increase	Third level: 30% [2017]	Arrest decline observed over 2007-2011 and subsequently drive an increase to 35% by 2020
C1.3.3	Open access to Science Foundation Ireland publications	60%	43%	Achieve 60% of Science Foundation Ireland publications by 2020 declared in Research Outputs to be openly accessible
D1.3.1	Cost of administration. Target = < 5% (benchmark against EU and other entities)	<5%	2.2% (€9.57m / €427.6m [SFI Finance data Q2 2017])	<5%
D1.3.2	Efficiency of grant review and management process	To be in the top quartile by 2015 by international benchmarks of time-to-grant	Average of 6.7 months in 2017	Average time to notification of five months

KPI#	Description	Current Target	Current Status	Discussion/new target detail/ revised forecast
D1.3.3	Attractiveness of Science Foundation Ireland as an employer and employability of Science Foundation Ireland staff	Example: >4 internships/year from 2013, >2 secondments per year from 2014, > one placement by international funding agencies from 2014	Science Foundation Ireland roles for 2017: Approximately 530 highly qualified individuals applied to work in Science Foundation Ireland during 2017 with 26 positions being filled throughout the year. Examples of these were Scientific Programme Managers (Pre, Post, EU), Finance Manager and Communications Executive	Average number of applicants to Science Foundation Ireland roles of 40. 50% of leavers to senior roles by 2020
D1.3.5	Developed audit of Science Foundation Ireland-funded higher education institutions to include areas such as research integrity, compliance with legal, ethical and licensing obligations, IP integrity, transparent, robust and fair processes to deal with allegations of research misconduct	Conducted by 2014	The Programmes Directorate in collaboration with Science Foundation Ireland Finance and Operations Directorate and Science Foundation Ireland's internal audit co-ordinator are finalising the steps involved in the quality assurance review/non-financial audit. These will include a) an agreed upon procedure (AUP) that will be incorporated into the programme of Financial Audit to be rolled out in Q3, and b) a 'data integrity check' step that was piloted by Post Award at a mid-term review of an Investigator Award this year (Q4 2017). A report is currently being prepared. Additional pilots will be conducted on awards of different subject matter before it is concluded how Science Foundation Ireland proceeds with this process	Finalise process and regularly carry out audits by 2020

Glossary

Agenda 2020 (A2020)

Biotechnology and Biological Sciences Research Council (BBSRC)

Career Development Award (CDA)

Challenge Based Funding (CBF)

Dublin City University (DCU)

Education & Public Engagement (EPE)

European Union EU

Enterprise Ireland (EI)

Engineering and Physical Sciences Research Council (EPSRC)

Foreign Direct Investment (FDI)

Future Research Leaders (FRL)

Higher Education Institute (HEI)

Higher Education Authority (HEA)

Innovation 2020 (I2020)

Irish Universities Association (IUA)

Partnerships for International Research and Education (PIRE)

Key Performance Indicators (KPIs)

National Science Foundation (NSF)

Performance Improvement Division (PID)

Research Centres (RC)

Research and Development (R & D)

Research, Development & Innovation (RD&I)

Research Integrity (RI)

Raidió Teilifís Éireann (RTE)

Science Foundation Ireland (SFI)

Starting Investigator Research Grant (SIRG)

Science, technology, engineering and mathematics (STEM)

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